

ARITHMETIC

Use the sequence $5 + 7 + 9 + 11 \dots$ to answer questions 1 - 5 $+2 +2$

ROUND TO THREE DECIMAL PLACES

1) Write an expression for the n^{th} term

$$t(n) = dn + a_0$$

↑ pattern ↑ 1st

$$\begin{aligned} d &= 2 \\ 2(1) + a_0 &= 5 \\ 2 + a_0 &= 5 \\ a_0 &= 3 \end{aligned}$$

$$t(n) = 2n + 3$$

2) What is the 32nd term?

$$t(32) = 2(32) + 3$$

$64 + 3$

$$67$$

3) What is the sum of the first 32 terms?

$$S = \frac{n}{2}(a_1 + a_n) \quad \frac{32}{2}(5 + 67) = 16(72)$$

1st + last

$$1152$$

4) 147 appears in the series which term is it?

$$147 = 2n + 3 \quad | \begin{matrix} -3 \\ -2 \end{matrix} \quad n = 72$$

$144 \quad | \quad 2n$

5) Write the series in summation (sigma) notation

don't know when it ends ...

$$\sum_{n=1}^n 2n + 3$$

6) Write the expanded form of $\sum_{n=1}^6 4n - 1$

$$\frac{4(1)-1}{n=1} + \frac{4(2)-1}{n=2} + \frac{4(3)-1}{n=3} + \frac{4(4)-1}{n=4} + \frac{4(5)-1}{n=5} + \frac{4(6)-1}{n=6}$$

$$3 + 7 + 11 + 15 + 19 + 23$$

GEOMETRIC

Use the sequence $2 + 6 + 18 + \dots + 13122$ to answer questions 7 - 87) What is the value of r ?

$$\frac{6}{2} = 3$$

$$\frac{18}{6} = 3$$

$$r = 3$$

rule: $t(n) = a(3)^{n-1}$

8) What is the sum of the series?

What is n ?

$$2(3)^{n-1} = 13122$$

$$S = \frac{a(1-r^n)}{1-r}$$

$$S = \frac{2(1-3^9)}{-2} = 19682$$

Find the sum of each series.

Arithmetic

$$9) \sum_{n=1}^{12} 3n \quad S = \frac{12}{2}(3 + 36)$$

$$234$$

Geometric

$$10) \sum_{n=1}^5 3(1.5)^n$$

$$S = \frac{3(1-1.5^5)}{1-1.5}$$

$$39.5625 - 19.78$$

-0.5

$$3^{n-1} = 6561$$

$$\frac{\log 6561}{\log 3} = n - 1$$

$$11) \sum_{n=1}^6 4n - 5$$

$$S = \frac{6}{2}(-1 + 19)$$

$3(18)$

$$54$$

$$r^n \rightarrow 0$$

12) Find the infinite sum: $400 + 200 + 100 \dots$

$$r = \frac{200}{400} = 0.5$$

$$S = \frac{a}{1-r}$$

$$\frac{400}{1-0.5} = \frac{400}{0.5}$$

$$800$$

$$\text{Answer: } 32x^5 + 80x^4 + 80x^3 + 40x^2 + 10x + 1$$

row 5 $\rightarrow 1 \ 5 \ 10 \ 10 \ 5 \ 1$

13) Expand $(2x+1)^5$

$$1(2x)^5 + 5(2x)^4(1)^1 + 10(2x)^3(1)^2 + 10(2x)^2(1)^3 + 5(2x)^1(1)^4 + 1(1)^5$$

row 11 $\rightarrow 1 \ 11 \ 55 \ 165 \ 330 \ 462 \ 462 \ 330 \ 165 \ 55 \ 11 \ 1$

14) Write the 2nd term of $(x+3)^{11}$

$$11(x)^{10}(3)^1 = 33x^{10}$$

15) A 6 dice are rolled. What is the probability of getting exactly 3 fives?

$$P(3 \text{ fives}) = {}_6C_3 \left(\frac{1}{6}\right)^3 \left(\frac{5}{6}\right)^3$$

$P(5) \quad P(\text{not } 5)$

$$5.4\%$$

$$20 \left(\frac{1}{6}\right)^3 \left(\frac{5}{6}\right)^3 = .054$$

16. What is the probability that a basketball player makes exactly 4 free throws in her next 6 attempts if her free throw percentage is:

a) .650
.350

$$32.8\%$$

b) .550
.450

$$27.8\%$$

c) .800
.200

$$24.6\%$$

$${}_6C_4 (.650)^4 (.350)^2$$

$${}_6C_4 (.550)^4 (.450)^2$$

18) The 7th term of an arithmetic series is 21 and the 21st term is 301. What is the tenth term?

$$\begin{aligned} +14 & \langle (7, 21) \rangle +280 \\ -11 & \langle (21, 301) \rangle -220 \\ & \langle (10, ?) \rangle \end{aligned}$$

$$d = \frac{280}{14} = 20$$

$$t(10) = 20(10) - 119$$

$$\begin{aligned} 20(7) + a_0 &= 21 \\ 140 + a_0 &= 21 \\ a_0 &= -119 \end{aligned}$$

$$81$$

$$\text{or } 21 + 60 = 81$$

19) Find the sum of the series $5 + 10 + 20 + 40 \dots + 5120$

geometric

$$5(2)^{n-1} = 5120$$

$$2^{n-1} = 1024$$

$$n-1 = 10$$

$$S = \frac{5(1-2^{11})}{1-2} = \frac{-10235}{-1} = 10235$$

20) What is the sum of the multiples of 10 between 1 and 501?

$$10 + 20 + 30 + \dots + 500$$

$$\frac{10 \cdot 50}{n=50}$$

$$S = \frac{50}{2} (10 + 500) = 12750$$

State whether each series is arithmetic, geometric, or neither.

21) $2 + 5 + 11 + 20 + \dots$

$$\begin{aligned} & \checkmark +3 \quad \checkmark +6 \quad \checkmark +9 \end{aligned}$$

neither

22) $-21 - 17 - 13 - 9 \dots$

$$\begin{aligned} & \checkmark +4 \quad \checkmark +4 \quad \checkmark +4 \end{aligned}$$

arithmetic

$$\frac{5}{2} = 2.5 \quad \frac{11}{5} = 2.2$$